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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 24

Application Number: 09/042,681
Filing Date: March 12, 1998
Appellant(s): ISHIDA ET AL.

Lawrence E. Ashery
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed January 2, 2002 and the supplemental appeal brief filed February 28, 2002.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 16-25 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,849,432	ANGELL et al.	12-1998
5,677,084	TSUKAMOTO et al.	10-1997
4,127,703	HOLLECK	11-1978
JP 7-153495	Japan	06-1995

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angell et al (U.S. Patent 5,849,432) in view of JP 7-153495.

In Example 17 (col. 14, lines 30-50), Angell et al. teach a rechargeable electrochemical cell comprising a carbon anode, an $LiCoO_2$ composite cathode, and a polymer gel electrolyte

including an $LiClO_4$ salt and a BEG:LiEC organic solvent. In addition to the $LiCoO_2$, the composite cathode comprises the gel polymer electrolyte.

Angell et al. do not explicitly teach that the composite cathode contains a ceramic (i.e., alumina) not relating to charge and discharge of the battery, or that the cathode is a "negative electrode".

In the abstract, JP 7-153495 teaches a lithium secondary battery comprising a positive electrode containing an $LiMn_2O_4$ active material and a ceramic (alumina) not relating to charge and discharge.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of the Japanese reference to incorporate alumina particles into the composite cathode of Angell et al. In the abstract, the Japanese reference teaches that capacity deterioration of the battery can be prevented by adding the ceramic particles to the positive electrode which comprises a lithium transition metal oxide. Accordingly, the artisan would have sufficient motivation to incorporate alumina particles into the composite cathode of Angell et al.

Regarding the limitation that the "negative electrode" contains the ceramic particles, the artisan would understand that the cathode of Angell et al. could in fact function as a negative electrode, depending on the mode of operation of the battery. During discharge of the battery, the cathode ($LiCoO_2$) would function as a positive electrode, however, during charging of the battery, it would function as a negative electrode. The anode (carbon material) of Angell et al. would have the opposite functions during charge and discharge. Accordingly, the recitation of

the negative electrode containing the ceramic particles is not considered to distinguish over the reference.

Regarding the claimed range of alumina content, the Japanese reference discloses that there are preferably 2 parts of alumina for 87 parts of lithium manganese oxide (on a 100-part basis, this is equal to 2.3 parts alumina for 100 parts $LiMn_2O_4$). Accordingly, since 2.3 falls within Applicant's claimed range of 0.01 to 10, this disclosure is considered to render this limitation obvious.

Regarding the particle size of the alumina, this is a parameter which may be optimized by the artisan to achieve a particular result. For example, by decreasing the particle size, the surface area is increased, which would allow more beneficial interaction within the positive electrode. It has been held that when the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation (In re Aller, Lacey, and Hall, 105 USPQ 233).

Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 7-153495.

In the abstract, JP 7-153495 teaches a lithium secondary battery comprising a microporous polypropylene separator and a positive electrode containing an $LiMn_2O_4$ active material and a ceramic (alumina) not relating to charge and discharge. As disclosed in paragraph [0007] of the computer-generated translation, the battery further comprises a nonaqueous

electrolyte solution dissolving a lithium salt and a negative electrode containing a carbon material that occludes and releases lithium.

The reference does not explicitly teach that the negative electrode contains the ceramic.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would understand that the positive electrode of the reference could in fact function as a negative electrode, depending on the mode of operation of the battery. As set forth above, during discharge of the battery, the cathode ($LiMn_2O_4$) would function as a positive electrode; however, during charging of the battery, it would function as a negative electrode. The anode (carbon material) of the reference would have the opposite functions during charge and discharge. Accordingly, the recitation of the negative electrode containing the ceramic particles is not considered to distinguish over the reference.

Regarding the particle size and content ranges of the alumina, these limitations are also not considered to distinguish over the reference, for the reasons set forth above.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 7-153495 as applied to claims 22-24 above, and further in view of Tsukamoto et al (U.S. Patent 5,677,084).

JP 7-153495 does not explicitly teach a positive active material comprising $LiCoO_2$.

In column 6, lines 63-65, Tsukamoto et al. teach a lithium secondary battery comprising $LiCoO_2$ as a positive active material.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would have sufficient motivation

to use $LiCoO_2$ as the positive active material of JP 7-153495. In the cited passage, Tsukamoto et al. teach that $LiCoO_2$ has a high voltage and a large energy density. Accordingly, the artisan would be motivated to use $LiCoO_2$ as the positive active material of JP 7-153495.

(11) Response to Argument

In the non-final Office Action of June 8, 2001, the Examiner rejected now-appealed claims 16-25, which rejections are reproduced in section 10 above. It was within these rejections that the Examiner first asserted that the positive and negative electrodes of a secondary battery reverse functions (i.e., polarity) upon charge and discharge of the battery. In response to the Office Action, in the appeal brief, Appellants have now requested evidence of this for the first time. Therefore, the Examiner submits that since this was Appellants' first request for evidence, the following arguments are made in support of the Examiner's position taken in the Office Action and therefore do not constitute a new ground of rejection.

As stated in section 6 of the brief, Appellants have questioned whether or not persons of ordinary skill in the art consider the negative electrode and the positive electrode of a secondary battery to be equivalent or interchangeable. The Examiner maintains herein that persons of ordinary skill in the art do in fact consider these electrodes to be equivalent or interchangeable. Attention is directed to the patent of Holleck (U.S. Patent 4,127,703). The patent is generally directed to a nickel-hydrogen secondary battery. Starting at column 1, line 17, the reference discloses the following:

> Each cell has a positive (during discharge), nickel-containing electrode, consistently designated as, "cathode" herein, spaced from a hydrogen-containing negative (during discharge) electrode consistently designated as "anode" herein.

The Examiner submits that this passage clearly recognizes that the electrodes of a secondary battery reverse polarity during the charge/discharge cycle. Therefore, a person of ordinary skill would be reasonably apprised that the electrodes of the secondary batteries of Angell et al. and JP 7-153495 would also reverse polarity in this manner. The instant claims do not contain a recitation of whether the negative electrode is negative during the charging or discharging of the battery. Such a recitation might be helpful in distinguishing the claims.

Appellants also place emphasis on the fact that the electrodes of the prior art are chemically different. However, the Examiner believes that it is important to note that the above grounds of rejection are not based on the artisan being motivated to *physically* exchange the materials comprising the positive and negative electrodes. The equivalence of the "positive" and "negative" designations arises from the reversing *functions* of the electrodes during the cycling of the battery. No physical modification of the battery structure would be necessary.

The above arguments are applicable to all of the claim groups (I, II, and III) designated by Appellants. For these reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Patent Examiner, Art Unit 1745

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attachments: Information Disclosure Statement (paper #19); Notice of References Cited; Interview Summary record

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/042,681	03/12/1998	AKIKO ISHIDA	MAT-5870	5427

7590 03/13/2002

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ART UNIT	PAPER NUMBER
1745	24

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Please find below and/or attached an Office communication concerning this application or proceeding.

A3-24

Interview Summary	Application No.	Applicant(s)	
	09/042,681	ISHIDA ET AL.	
	Examiner	Art Unit	
	Jonathan S. Crepeau	1745	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Jonathan S. Crepeau*. (3)_____.

(2) *Larry Ashery*. (4)_____.

Date of Interview: *27 February 2002* .

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☒ No.
If Yes, brief description: _____ .

Claim(s) discussed: *26-30* .

Identification of prior art discussed: _____ .

Agreement with respect to the claims f)☐ was reached. g)☐ was not reached. h)☒ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *Examiner indicated that appeal brief was defective since not all claim were addressed. Applicant's representative indicated he would have a supplemental appeal brief hand-delivered to the Examiner* .

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

i)☒ It is not necessary for applicant to provide a separate record of the substance of the interview(if box is checked).

Unless the paragraph above has been checked, THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

_____
Examiner's signature, if required